Fact Sheet - October 1999

United States Environmental Protection Agency

US Army Corps of Engineers
New England District

Long Island Sound Dredged Material Disposal EIS

Dredging Needs & Alternatives

Dredging Needs

Conduct Review of Available Data Sources and Information

Literature Surveys and Interviews: The Corps and EPA canvassed prospective sources of research, information, studies and data on Long Island Sound relative to the issues surrounding dredging, dredged material disposal and resources. A preliminary round of this search was used as a basis for the Site Evaluation Report prepared in November 1998 for the four following active disposal sites.

- Western Long Island Sound (WLIS)
- Central Long Island Sound (CLIS)
- Cornfield Shoals (CSDS)
- New London (NLDS).

A more complete search and assessment of available information was assembled into a database inventory of sources. This database, with a report and user's manual prepared in July 1999, will be on the project web site in the Fall of 1999.

Define Dredging Needs, Material Types and Disposal Site Capacity

Historical Dredging Trends and Disposal Practices: The Corps and EPA are compiling data and information on Federal and non-federal dredging and disposal activities and practices in the Long Island Sound area.

Dredging Needs and Sediment Classification Projections (by Harbor): The historic dredging information will be used to identify historic disposal areas and to project future dredging needs. Historic sediment chemistry data will be reviewed to project the quality of future dredged materials. Coastal communities and navigation-dependent facilities will be examined in the study area to better determine the needs for future private dredging and potential Federal improvement dredging needs.

Disposal Site Availability and Capacity Needs: Active and historic disposal sites will be examined to develop estimates of capacity to accept additional dredged material suitable for placement at those sites.

Alternative Dredging Methods

Different materials require different dredging methods depending on the disposal option selected.

Mechanical Dredging

Mechanical dredging involves removal of material by a bucket, placement of the material in a scow or on a barge, and towing that scow or barge to a disposal or transfer area. If a scow is used with open water disposal, the doors would open at the disposal site, releasing the material to fall through the water column to the bottom. If a scow or barge is used with any other type of disposal, it would be towed to the disposal or transfer site where another bucket machine would remove the material from the scow or barge and transfer it onto a vehicle or directly into a nearshore disposal area.

Hydraulic Dredging – Pipeline

Hydraulic pipeline dredging involves use of a hydraulic (suction) dredge, most commonly for either beach nourishment of suitable sands, or deposit into an upland containment area (for dewatering or direct disposal). Typically the dredge uses a cutterhead on the end of the suction arm to loosen the material while the dredge pump suctions the loosened material through the arm to the pump in a slurry of about 75 to 90 percent water and 10 to 25 percent sediment. The slurry is pumped through a pipeline to a disposal site or dewatering/transfer area. Depending on the size and power of the dredge pump, the pipeline is typically limited to about one mile in length, without employing a second "booster" pump for greater distances.

Hydraulic Dredging – Hopper

A hopper dredge uses a similar suction method to remove material from the dredge area, but deposits it in a hopper aboard the vessel, rather than discharging the material through a pipeline. Hoppers can move any type of unconsolidated material, but are most often used for suitable sandy material with disposal in the nearshore bar system off of a beach, retaining the dredged sand in the littoral system.

Disposal Alternatives for Dredged Material

Disposal of Materials Suitable for Open Water Disposal

Materials determined to be suitable for open water disposal through application of the Clean Water Act (CWA) and the Marine Protection Research and Sanctuaries Act (MPRSA) testing criteria are generally available for all disposal options and methods. Open water disposal, beneficial use, and placement in confined disposal facilities are all available for materials meeting the CWA/MPRSA standards, though states apply different standards for upland disposal. Listed below are the most common examples of these types of disposal options.

Open-Water Disposal

- Open-Water Disposal at the Four Currently Active Sites
- Open-Water Disposal at other Historically Used Sites in Long Island Sound (LIS) and Block Island Sound (BIS)
- Identification of New Potential Open-Water Disposal Sites in LIS and BIS
- Identification of New Potential Open-Water Disposal Sites Outside LIS and BIS

Beneficial Use of Dredged Material

- Marsh Creation in Nearshore Areas
- Island Habitat Creation (Marsh, Upland, Shallow Subtidal, or Combination)
- Beach Nourishment (Compatible Materials)
- Habitat Creation - Oyster Beds, Seagrass Beds, Tidal Flats (Compatible Material)

Confined Disposal Facility (CDF)

- Nearshore CDF – Eventual Island Creation (Long Term)
- Upland – Landfill Cover Material
- Upland – Quarry/Mine/Borrow Pit Filling/Remediation
- Upland/Along Shore – Structural Fill (Compatible Materials) for Port Development

Alternative Treatment Methods

Dredged materials which do not meet the standards required for CWA/MPRSA or state upland disposal standards require treatment, confinement or a combination of the two. Treatment may reduce or eliminate the need for confinement or other special handling of the materials. Different treatment methods are targeted to different contaminants and contaminant levels. Depending on the nature of the various contaminants that may be present in the proposed dredged material and the level of contamination, a series of different treatments (termed a treatment train) may be employed on the same material.

Pretreatment (Dewatering, Washing, Separation)

Dewatering of hydraulically dredged materials, usually in a contained facility, is a prerequisite to most other treatment technologies. Addition of pretreatment materials to the dredged material pipeline slurry during hydraulic discharge, to promote separation of finer materials, or as a delivery mechanism for chemical and biological treatment additives are described below. Other means of physical separation of more contaminated fine materials from the dredged material can reduce the volume requiring further treatment or containment.

Thermal Treatment (Incineration, Vitrification)

These methods volatilize the organic contaminants in the dredged material, and some also stabilize the non-organic (metals) contaminants and may make the resulting product suitable for commercial applications, such as cement production.

Chemical Treatment and Separation

Chemical additives are applied to separate or promote extraction of contaminants from the sediment or to break down organic contaminants into non-toxic forms.

Biological Treatment

Microorganisms are added to the dredged material to biologically degrade organic contaminants coupled with physical methods for promoting degradation, such as composting, selective planting, and use of biological reactors.

Stabilization

This involves use of encapsulation or mixing with other materials to stabilize the contaminants in the dredged material, or to solidify the dredged material, to prevent future leaching or other migration of contaminants away from the dredged material.

Alternatives for Containment of Dredged Material

Confined Disposal Facilities (CDF)

These involve the isolation of dredged materials in confined facilities. Occasionally, contaminated dredged materials are used in the remediation of other contaminated lands as interim cover material or in containment construction. Usually the contaminated dredged material is placed within a containment (diked or bulkheaded area). The containment can be located upland, along shore or offshore. The contaminants present and site chosen will dictate the extent to which the containment is assured by use of liners and covers.

Examples of containment facilities are:

- Upland – Landfills (Fill or Cover)
- Upland – Brownfields Remediation
- Nearshore CDFs (Port Development or Open Space Creation)
- Island CDFs (Together with Suitable Material)

Confined Aquatic Disposal (CAD)

Confinement of materials in an aquatic environment can be accomplished without constructing a containment facility through capping of the unsuitable material with suitable material, or by excavation and capping of a disposal pit to confine the material. The unsuitable material can also be isolated in geotextile bags, and the deposit of bags then capped.

Examples of CAD alternatives are:

- Capping of Disposal Mounds
- Capped Disposal Pits
- Capped In-Channel Pits
- Geotextile Encapsulation

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